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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: In-Ki Hwang

Confirmation No.: 2217

Serial No. 10/750,668

Group Art Unit: 3747

Filed: December 31, 2003

Examiner: Kwon, John

For: *Two-Step Combustion System*

Attorney Docket No.: 060945-0158-US

RESPONSE TO OFFICE ACTION

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This response is in reply to the Office Action from the U.S. Patent and Trademark Office dated July 27, 2004, please enter the following amendments and remarks into the file of the above identified application.

Pursuant to the ultimate paragraph of this amendment, the Commissioner is authorized to charge any required fees to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order No. 060945-0158-US).

**AMENDMENTS**

Please revise the claims, and add new claims, as follows:

1. (Currently Amended) A two-step combustion system of an engine, wherein a fuel-air mixture is sucked into a combustion chamber by an operation of a suction valve driven by a cam for said suction valve mounted at an upper side of a cylinder head, and ignited by an ignition plug and burnt, the system comprising:

an auxiliary combustion chamber formed at an upper lateral surface of a main combustion chamber to be recessed toward a cylinder head , wherein said fuel-air mixture of said combustion chamber is sucked into said auxiliary combustion chamber and only discharged from the auxiliary chamber into said main combustion chamber once combustion has commenced within said main chamber;

a cam for an auxiliary combustion chamber valve formed on a suction valve at a cam shaft mounted at an upper side of said cylinder head and connected to a crankshaft of an engine via a belt to receive power for rotation;

a rocker arm for being contacted at a first bottom distal end surface of said rocker arm with a surface of the cam for an auxiliary combustion chamber valve and swung about a fixed axle to thereby transfer power by way of leverage operation; and

an auxiliary combustion chamber valve being contacted at a second bottom distal end surface of said rocker arm to vertically move and to open and close an inlet of said auxiliary combustion chamber.

2. (Original) The system as defined in claim 1, wherein said cam for said auxiliary combustion chamber is formed on the same cam shaft as that of said suction valve cam.

3. (Currently Amended) The system as defined in claim 1, wherein ~~the~~ said cam for said auxiliary combustion chamber is shaped like an eccentric circle such that said auxiliary combustion chamber valve ~~can be~~ is opened up prior to an end of compression , ~~and closed just before ignition , and opened after the middle of an explosion stroke.~~

4. (New) A two-step combustion system of an engine, said combustion system comprising:

a main combustion chamber in which a primary combustion occurs during an explosion stroke;

an auxiliary combustion chamber extending from said main combustion chamber;

an auxiliary combustion chamber valve configured to discharge a fuel-air mixture into said main combustion chamber only once said primary combustion has commenced within said main chamber, thereby causing a secondary combustion within at least said main combustion chamber.

5. (New) The two-step combustion system of claim 4, wherein said auxiliary combustion chamber valve is configured to discharge a fuel-air mixture into said main combustion chamber after a middle of an explosion stroke.

6. (New) The two-step combustion system of claim 4, wherein said auxiliary combustion chamber valve is also configured to open prior to an end of compression and close prior to ignition.

7. (New) The two-step combustion system of claim 4, further comprising:  
a cam for said auxiliary combustion chamber valve formed on a suction valve cam shaft mounted at an upper side of a cylinder head and connected to a crankshaft of an engine via a belt to receive power for rotation;

a rocker arm for being contacted at a first bottom distal end surface of said rocker arm with a surface of the cam for an auxiliary combustion chamber valve and swung about a fixed axle to thereby transfer power by way of leverage operation, wherein said auxiliary combustion chamber valve is contacted at a second bottom distal end surface of said rocker arm to vertically move and to open and close an inlet of said auxiliary combustion chamber.

8. (New) The system as defined in claim 7, wherein said cam for said auxiliary combustion chamber is formed on the same cam shaft as that of said suction valve cam.

9. (New) The system as defined in claim 7, wherein said cam for said auxiliary combustion chamber is shaped like an eccentric circle such that said auxiliary combustion chamber valve is opened prior to an end of compression, closed before ignition, and opened after the middle of an explosion stroke.